

The Properties of "Turbulence" at Comets

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The process of cometary ion pickup by the solar wind allows a unique opportunity to study the properties of nonlinear low frequency plasma waves, their phase steepening, eventual wave "breaking" and the development of partial and full plasma turbulence. This opportunity is unique to the cometary case because the waves are initially generated at the ion cyclotron frequency, the "pump" for the turbulence system. Because the pump frequency is essentially the ion cyclotron frequency in the spacecraft frame, waves at frequencies above and below the pump which are due to cascade and inverse cascade processes, wave-particle interactions and nonlinear steepening are clearly identifiable and therefore amenable to analysis. We have examined the magnetic field data and plasma data of all three comets which have been encountered by spacecraft: Giacobini-Zinner (1 985), Halley (1 986), and Grigg-Skjellerup (1992). We will describe the "turbulence" at the three comets and discuss similarities and differences among them.

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